12. REFERENCES

Acquavella, JF. (1989) The paradox of butadiene epidemiology. Exp Pathol 37:114.

Adler, ID; Anderson, D. (1994) Dominant lethal effects after inhalation exposure to 1,3-butadiene. Mutat Res 309:295-297.

Adler, ID; Cao, J; Filser, JG; et al. (1994) Mutagenicity of 1,3-butadiene inhalation in somatic and germinal cells of mice. Mutat Res 309:307-314.

Adler, ID; Filser, JG; Gassner, P; et al. (1995) Heritable translocations induced by inhalation exposure of male mice to 1,3-butadiene. Mutat Res 347:121-127.

Agency for Toxic Substances and Disease Registry (ATSDR) (1992) Toxicological profile for 1,3-butadiene. TP-91/07, PB93-11690. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA.

Albertini, RJ; Castle, KL; Borcherding, WR. (1982) T-cell cloning to detect the mutant 6-thioguanine-resistant lymphocytes present in human peripheral blood. Proc Natl Acad Sci USA 79:6617-6621.

Allen, BC; Kavlock, RJ; Kimmel, CA; et al. (1994a) Dose-response assessment for development toxicity: III. Statistical models. Fundam Appl Toxicol 23:496-509.

Allen, BC; Kavlock, RJ; Kimmel, CA; et al. (1994b) Dose-response assessment for developmental toxicity: II. Comparison of generic benchmark dose estimates with NOAELs. Fundam Appl Toxicol 23:487-495.

American Congress of Government Industrial Hygienists (ACGIH). (1994) World-wide limits for toxic and hazardous chemicals in air, water, and soil. ACGIH Pub. No. 9565.

Anderson, EL; U.S. EPA Carcinogen Assessment Group. (1983) Quantitative approaches in use to assess cancer risk. Risk Anal 3:277-295.

Anderson, D; Edwards, AJ; Brinkworth, MH. (1993) Male-mediated F_1 effects in mice exposed to 1,3-butadiene. In: Butadiene and styrene: assessment of health hazards. IARC Scientific Publications. Vol. 127. Sorsa, M; Peltonen, K; Vainio, H; et al., eds. Lyon, France: International Agency for Research on Cancer, pp. 171-181.

Anderson, D; Edwards, AJ; Brinkworth, MH. (1995) The detection of dominant lethal mutations and foetal malformations, tumours and chromosome damage in the offspring of male mice treated sub-chronically with butadiene. BIBRA Report No. 1060/5/95.

Andjelkovich, D; Taulbee J; Symons, M. (1976) Mortality experience of a cohort of rubber workers, 1964-1973. J Occup Med 18:387-394.

Andjelkovich, D; Taulbee, J; Symons, M. (1977) Mortality of rubber workers with reference to work experience. J Occup Med 19:397-405.

Anon. (1991) Chemical profile: butadiene. Chem Mark Rep 239:50.

Arce, GT; Vincent, DR; Cunningham, MJ; et al. (1990) In vitro and in vivo genotoxicity of 1,3-butadiene. Environ Health Perspect 86:75-78.

Armitage, P. (1971) Statistical methods in medical research. New York, NY: John Wiley and Sons, pp. 362-365.

Arms, A; Travis, C. (1988) Reference physiological parameters in pharmacokinetic modelling. U.S. Environmental Protection Agency. EPA/600/6-88/004.

Au, WW; Bechtold, WE; Wharton, EB, Jr.; et al. (1995) Chromosome aberrations and response to gamma-ray challenge in lymphocytes of workers exposed to 1,3-butadiene. Mutat Res 334:125-130.

Bailer, AJ; Portier, CJ. (1988) Effects of treatment-induced mortality and tumor-induced mortality on tests for carcinogenicity in small samples. Biometrics 44:417-431.

Barnes, DG; Dourson, M; U.S. EPA Reference Dose Work Group. (1988) Reference dose (RfD): Description and use in health risk assessments. Reg Toxicol Pharmacol 8:471-86.

Beaumont, JJ; Breslow, NE. (1981) Power considerations in epidemiologic studies of vinyl chloride workers. Am J Epidemiol 114:725-734.

Bechtold, WE; Strunk, MR; Chang, I-Y; et al. (1994) Species differences in urinary metabolite ratios between mice, rats, and humans. Toxicol Appl Pharmacol 127:44-49.

Bechtold, WE; Strunk, MR; Thornton-Manning, JR; et al. (1995) Analysis of butadiene, butadiene monoxide and butadiene diepoxide in blood by gas chromatography/gas chromatography/mass spectroscopy. Chem Res Toxicol 8:182-187.

Bernadini, S; Pelin, K; Peltonen, K; et al. (1996) Induction of sister chromatid exchange by 3,4-epoxybutane-1,2-diol in cultured human lymphocytes of different GSTT1 and GSTM1 genotypes. Mutat Res 361:121-127.

Bolt, HM; Schmeidel, G; Filser, JG; et al. (1983) Biological activation of 1,3-butadiene to vinyl oxirane by rat liver microsomes and expiration of the reactive metabolite by exposed rats. J Cancer Res Clin Oncol 106:112-116.

Bolt, HM; Filser, JG; Störmer, F. (1984) Inhalation pharmacokinetics based on gas uptake studies. Arch Toxicol 55:213-218.

Bond, JA; Csanády, GA. (1991) Species and organ differences in the in vitro metabolism of butadiene to butadiene monoepoxide. Proc Am Assoc Cancer Res 32:119.

Bond, JA; Dahl, AR; Henderson, RF; et al. (1986) Species differences in the disposition of inhaled butadiene. Toxicol Appl Pharmacol 84:617-627.

Bond, JA; Dahl, AR; Henderson, RF; et al. (1987) Species differences in the distribution of butadiene in tissues. Am Ind Hyg Assoc J 48:867-872.

Boogaard, PJ; Bond, JA. (1996) The role of hydrolysis in the detoxication of 1,2:3,4-diepoxybutane by human, rat, and mouse liver and lung in vitro. Toxicol Appl Pharmacol 141:617.

Boogaard, PJ; Sumner, SCJ; Bond, JA. (1996) Glutathione conjugation of 1,2:3,4-diepoxybutane in human liver and rat and mouse liver and lung in vitro. Toxicol Appl Pharmacol 136:307-316.

Brunnemann, KD; Kagan, MR; Cox, JE; et al. (1990) Analysis of 1,3-butadiene and other selected gas-phase components in cigarette mainstream and sidestream smoke by gas chromatography-mass selective detection, Carcinogenesis 11:1863.

Budavari, S, ed. (1989) The Merck index, 11th ed. Rahway, NJ:Merck & Co., pp. 230-231.

California Air Resources Board. (1991) Proposed identification of 1,3-butadiene as a toxic air contaminant. Prepared by the Office of Environmental Health Hazard Assessment, Sacramento, CA.

California Air Resources Board. (1992) Proposed identification of 1,3-butadiene as a toxic air contaminant. Part A. Exposure assessment. Stationary Source Division, Sacramento, CA.

Campbell, DL; Mangino, J. (1994) Evaluation and improvement of the Puget Sound toxic air contaminants emissions inventory. Prepared by Radian Corporation for the Office of Research and Development, U.S. Environmental Protection Agency, Washington, DC, under EPA contract no. 68-D1-0031.

Carpenter, CP; Shaffer, CB; Weil, CS; et al. (1944) Studies on the inhalation of 1,3-butadiene; with a comparison of its narcotic effect with benzol, toluol and styrene, and a note on the elimination of styrene by the human. J Ind Hyg Toxicol 26:69-78.

Checkoway, H; Williams, TM. (1982) A hematology survey of workers at a styrene-butadiene synthetic rubber manufacturing plant. Am Ind Hyg Assoc J 43:164-169.

Cheng, X; Ruth, JA. (1993) A simplified methodology for quantitation of butadiene metabolites. Application of the study of butadiene metabolism by rat liver microsomes. Drug Metab Dispos 21:121-124.

Citti, L; Gervasi, PG; Turchi, G; et al. (1984) The reaction of 3,4-epoxy-1-butene with deoxyguanosine and DNA in vitro: synthesis and characterization of the main adducts. Carcinogenesis 5:47-52.

Cochrane, JE; Skopek, TR. (1993) Mutagenicity of 1,3-butadiene and its epoxide metabolites in human TK6 cells and splenic T cells isolated from exposed B6C3F1 mice. In: Butadiene and styrene: assessment of health hazards. IARC Scientific Publications. Vol. 127. Sorsa, M; Peltonen, K; Vainio, H; et al., eds. Lyon, France: International Agency for Research on Cancer, pp. 195-204.

Cochrane, JE; Skopek, TR. (1994a) Mutagenicity of butadiene and its epoxide metabolites: I. Mutagenic potential of 1,2-epoxybutene, 1,2,3,4-diepoxybutane and 3,4-epoxy-1,2-butanediol in cultured human lymphoblasts. Carcinogenesis 15:713-717.

Cochrane, JE; Skopek, TR. (1994b) Mutagenicity of butadiene and its epoxide metabolites: II. Mutational spectra of butadiene, 1,2-epoxybutene, and diepoxybutane at the hprt locus in splenic T cells from exposed B6C3F, mice. Carcinogenesis 15:719-723.

Cole, P; Delzell, E; Acquavella, J. (1993) Exposure to butadiene and lymphatic and hematopoietic cancer. Epidemiology 4:86.

Concawe. (1987) A survey of exposures to gasoline vapour. Report No. 4/87. de Hague: Concawe.

Cowles, SR; Tsai, SP; Snyder, PJ; et al. (1994) Mortality, morbidity, and haematologic results from a cohort of long-term workers involved in 1,3-butadiene monomer production. Occup Environ Med 51:323-329.

Cox, DR. (1972) Regression models and life tables. J R Stat Soc B34:187-220.

Crisp, TM. (1992) Organization of the ovarian follicle and events in its biology: oogenesis, ovulation or atresia. Mutat Res 296:89-106.

Crump, KS. (1995) Calculation of benchmark doses from continuous data. Risk Anal 15:79-89.

Crump, KS. (1984) A new method for determining allowable daily intakes. Fundam Appl Toxicol 4:854-871.

Csanády, GA; Bond, JA. (1991) Species differences in the biotransformation of 1,3-butadiene to DNA-reactive epoxides: role in cancer risk assessment. Chemical Industry Institute of Toxicology, CIIT Activities 11:1-8.

Csanády, GA; Guengerich, FP; Bond, JA. (1992) Comparison of the biotransformation of 1,3-butadiene and its metabolite, butadiene monoepoxide, by hepatic and pulmonary tissue from humans, rats, and mice. Carcinogenesis 13:1143-1153.

Dahl, AR; Birnbaum, LS; Bond, JA; et al. (1987) The fate of isoprene inhaled by rats: comparison to butadiene. Toxicol Appl Pharmacol 89:237-242.

Dahl, AR; Bechtold, WE; Bond, JA; et al. (1990) Species differences in the metabolism and disposition of inhaled 1,3-butadiene and isoprene. Environ Health Perspect 86:65-69.

Dahl, AR; Sun, DJ; Birnbaum, LS; et al. (1991) Toxicokinetics of inhaled 1,3-butadiene in monkeys: comparison to toxicokinetics in rats and mice. Toxicol Appl Pharmacol 110:9-19.

de Meester, C. (1988) Genotoxic properties of 1,3-butadiene. Mutat Res 195:273-281.

de Meester, C; Poncelet, F; Roberfroid, M; et al. (1980) The mutagenicity of butadiene towards *Salmonella typhimurium*. Toxicol Lett 6:125-130.

Del Monte, M; Citti, L; Gervasi, PG. (1985) Isoprene metabolism by liver microsomal monooxygenases. Xenobiotica 15:591-597.

Delzell, E; Sathiakumar, N; Macaluso, M. (1995) A follow-up study of synthetic rubber workers. Final report prepared under contract to International Institute of Synthetic Rubber Producers.

Delzell, E; Sathiakumar, N; Hovinga, M. (1996) A follow-up study of synthetic rubber workers. Toxicology 113:182-189.

Deutschmann, S. (1988) Vergleichende Untersuchungen zur Depletion von zellulärem Glutathion durch 1,3-Butadien bei Maus und Ratte. Thesis. Ruhr-Universität, Bochum, Germany.

Deutschmann, S; Laib, RJ. (1989) Concentration-dependent depletion of non-protein sulfhydryl (NPSH) content in lung, heart and liver tissue of rats and mice after acute inhalation exposure to butadiene. Toxicol Lett 45:175-183.

Divine, BJ. (1990) An update on mortality among workers at a 1,3-butadiene facility—preliminary results. Environ Health Perspect 86:119-128.

Divine, BJ; Hartman, CM. (1996) Mortality update of butadiene production workers. Toxicology 113:169-181.

Divine, BJ; Wendt, JK; Hartman, CM. (1993) Cancer mortality among workers at a butadiene facility. In: Butadiene and styrene: assessment of health hazards. IARC Scientific Publications. Vol. 127. Sorsa, M; Peltonen, K; Vainio, H; et al., eds. Lyon, France: International Agency for Research on Cancer, pp. 345-362.

Doerr, JK; Hooser, SB; Smith, BJ; et al. (1995) Ovarian toxicity of 4-vinylcyclohexene and related olefins in B6C3F₁ mice: role of diepoxides. Chem Res Toxicol 8:963-969.

Doerr, JK; Hollis, EA; Sipes, IG. (1996) Species difference in the ovarian toxicity of 1,3-butadiene epoxides in B6C3F₁ mice and Sprague-Dawley rats. Toxicology 113:128-136.

Downs, TD; Crane, MM; Kim, KW. (1987) Mortality among workers at a butadiene facility. Am J Ind Med 12:311-329.

Downs, T; Pier, S; Crane, M. (1992) Cause-specific mortality in a cohort of 1,000 ABS workers. Abstr Symp. Butadiene and styrene: assessment of health hazards. Espoo, Finland.

Duescher, RJ; Elfarra, AA. (1992) 1,3-Butadiene oxidation by human myeloperoxidase: role of chloride ion in catalysis of divergent pathways. J Biol Chem 267:19859.

Duescher, RJ; Elfarra, AA. (1993) Chloroperoxidase-mediated oxidation of 1,3-butadiene to 3-butenal, a crotonaldehyde precursor. Chem Res Toxicol 6:669-673.

Duescher, RJ; Elfarra, AA. (1994) Human liver microsomes are efficient catalysts for 1,3-butadiene oxidation: evidence for major roles by cytochrome P450 2A6 and 2E1. Arch Biochem Biophys 311:342-349.

Dunnick, JK; Eustis, SL; Piegorsch, WW; et al. (1988) Respiratory tract lesions in F344/N rats and B6C3F₁ mice after inhalation exposure to 1,2-epoxybutane. Toxicology 50:69-82.

Elfarra, AA; Duescher, RJ; Pasch, CM. (1991) Mechanisms of 1,3-butadiene oxidations to butadiene monoxide and crotonaldehyde by mouse liver microsomes and chloroperoxidase. Arch Biochem Biophys 286:244-251.

Elfarra, AA; Sharer, JE; Duescher, RJ. (1995) Synthesis and characterization of N-acetyl-L-cysteine S-conjugates of butadiene monoxide and their detection and quantitation in urine of rats and mice given butadiene monoxide. Chem Res Toxicol 8:68-76.

Evelo, CTA; Oostendorp, JGM; ten Berge, WF; et al. (1993) Physiologically based toxicokinetic modeling of 1,3-butadiene lung metabolism in mice becomes more important at low doses. Environ Health Perspect 101:496-502.

Filser, JG. (1992) The closed chamber technique—uptake, endogenous production, excretion, steady-state kinetics and rates of metabolism of gases and vapors. Arch Toxicol 66:1-10.

Filser, JG; Bolt, HM. (1984) Inhalation pharmacokinetics based on gas uptake studies. Arch Toxicol 55:219-223.

Filser, JG; Althaler, B; Welter, HF; et al. (1992) Metabolism of 1,3-butadiene in microsomes from livers of mouse, rat, and man. Naunyn-Schmiedeberg's Arch Toxicol Suppl 345:R31.

Fiserova-Bergerova, V; Diaz, ML. (1986) Determination and prediction of tissue gas partition coefficients. Int Arch Occup Environ Health 58:75-87.

Frank, PM. (1978) Introduction to system sensitivity theory. New York: Academic Press.

Frome, EL; Checkoway, H. (1985) Use of Poisson regression models in estimating incidence rates and ratios. Am J Epidemiol 121(2):309-22.

Gart, JJ; Chu, KC; Tarone, RE. (1979) Statistical issues in interpretation of chronic bioassay for carcinogenicity. J Natl Cancer Inst 62:957-974.

Gaylor, DW; Slikker, W. (1990) Risk assessment for neurotoxic effects. Neurotoxicology 11:211-218.

Gervasi, PG; Longo, V. (1990) Metabolism and mutagenicity of isoprene. Environ Health Perspect 86:85-87.

Gervasi, PG; Citti, L; Del Monte, M; et al. (1985) Mutagenicity and chemical reactivity of epoxide intermediates of the isoprene metabolism and other structurally related compounds. Mutat Res 156:77-82.

Gibson, RW; Bross, IDJ; Lilienfeld, AM; et al. (1968) Leukemia in children exposed to multiple risk factors. New Engl J Med 279:906-909.

Goodrow, T; Reynolds, S; Maronpot, R; et al. (1990) Activation of K-ras by codon 13 mutations in C57BL/6 \times C3HF₁ mouse tumors induced by exposure to 1,3-butadiene. Cancer Res 50:4818-4823.

Greep, RO; Weis, L. (1977) Histology. New York: McGraw-Hill.

Hackett, PL; Sikov, MR; Mast, TJ; et al. (1987a) Inhalation developmental toxicology studies of 1,3-butadiene in the rat (final report). Richland, WA: Pacific Northwest Laboratory; PNL Report No. PNL-6414 UC-48; NIH Report No. NIH-401-ES-41031; 104 p. Prepared for NIEHS, NTP, under a Related Services Agreement with the U.S. Department of Energy under contract DE-AC06-76RLO-1830.

Hackett, PL; Sikov, MR; Mast, TJ; et al. (1987b) Inhalation developmental toxicology studies: teratology study of 1,3-butadiene in mice (final report). Richland, WA: Pacific Northwest Laboratory; PNL Report No. PNL-6412 UC-48; NIH Report No. NIH-401-ES-40131; 92 p. Prepared for NIEHS, NTP, under a Related Services Agreement with the U.S. Department of Energy under contract DE-AC06-76RLO-1830.

Hackett, PL; McClanahan, BJ; Brown, MG; et al. (1988a). Sperm-head morphology study in $B6C3F_1$ mice following inhalation exposure to 1,3-butadiene (final technical report). Richland, WA: Pacific Northwest Laboratory; PNL Report No. PNL-6459 UC-48; NIH Report No. NIH-Y01-ES-70153; 51 p. Prepared for NIEHS, NTP, under a Related Services Agreement with the U.S. Department of Energy under contract DE-AC06-76RLO-1830.

Hackett, PL; McClanahan, BJ; Mast, TJ; et al. (1988b). Dominant lethal study in CD-1 mice following inhalation exposure to 1,3-butadiene (final technical report). Richland, WA: Pacific Northwest Laboratory; PNL no. PNL-6545 UC-408; NIH no. NIH-Y01-ES-70153; 85 p. Prepared for NIEHS, NTP, under a Related Services Agreement with the U.S. Department of Energy under contract DE-AC06-76RLO-1830.

Haley, TJ, Jr. (1978) Chloroprene (2-chloro-1,3-butadiene) Cwhat is the evidence for its carcinogenicity? Clin Toxicol 13:153-170.

Hallenbeck, W. (1992) Cancer risk assessment for the inhalation of 1,3-butadiene using physiologically based pharmacokinetic modelling. Bull Environ Contam Toxicol 49:66-70.

Hattis, D; Wasson, J. (1987) Pharmacokinetic/mechanism-based analysis of the carcinogenic risk of butadiene. PB88-20817. Rockville, MD: National Institute for Occupational Safety and Health, pp. 1-122.

Hayes, RB; Xi, L; Bechtel, W; et al. (1996) hprt Mutation frequency among workers exposed to 1,3-butadiene in China. Toxicology 113:100-105.

Hazleton Laboratories Europe, Ltd. (HLE). (1981) 1,3-Butadiene: inhalation teratogenicity study in the rat (final report). Harrowgate, England: Hazleton Labs; addendum no. 2788-522/3.

Himmelstein, MW; Turner, MJ; Asgharian, B; et al. (1994) Comparison of blood concentrations of 1,3-butadiene and butadiene epoxides in mice and rats exposed to 1,3-butadiene by inhalation. Carcinogenesis 15:1479-1486.

Himmelstein, MW; Asgharian, B; Bond, JA. (1995) High concentrations of butadiene epoxides in livers and lungs of mice compared to rats exposed to 1,3-butadiene. Toxicol Appl Pharmacol 132:281-288.

Himmelstein, MW; Acquavella, JF; Recio, L; et al. (1997) Toxicology and epidemiology of 1,3-butadiene. Crit Rev Toxicol 27(1):1-108.

Howe, RB; Van Landingham, C. (1986) GLOBAL86: a computer program to extrapolate quantal animal toxicity data to low doses. EPA Contract No. 68-01-6826. KS Crump and Company, Ruston, LA. Unpublished.

Huff, JE; Melnick, RL; Solleveld, HA; et al. (1985) Multiple organ carcinogenicity of 1,3-butadiene in B6C3F₁ mice after 60 weeks of inhalation exposure. Science 227:548-549.

Hunt, WF, Jr.; Faoro, R; Hudischewskyj, AB; et al. (1988) The EPA interim database for air toxics volatile organic chemicals. Systems Applications, Inc., and U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA/450/4-88-014.

International Agency for Research on Cancer (IARC). (1982) IARC monographs on the evaluation of carcinogenic risk of chemicals to humans. Vol. 28. The rubber industry. Lyon, France: International Agency for Research on Cancer.

International Agency for Research on Cancer (IARC). (1986) IARC monographs on the evaluation of carcinogenic risk of chemicals to humans. Vol. 39. Some chemicals used in plastics and elastomers butadiene. Lyon, France: International Agency for Research on Cancer, pp. 155-179.

International Agency for Research on Cancer (IARC). (1992) IARC monographs on the evaluation of carcinogenic risks to humans. Vol. 54. 1,3-Butadiene. Occupational exposures to mists and vapours from strong inorganic acids and other industrial chemicals. Lyon, France: International Agency for Research on Cancer, pp. 237-287.

International Institute of Synthetic Rubber Producers (IISRP). (1982) 1,3-Butadiene: inhalation teratogenicity in the rat (final report with cover letter dated 08/11/82). Report no. 2788-522/3; submission 8EHQ-0382-0441. Harrowgate, England: Hazleton Laboratories Europe, Ltd.

Irons, RD. (1990) Studies on the mechanism of 1,3-butadiene-induced leukemogenesis: the potential role of endogenous murine leukemia virus. Environ Health Perspect 86:49-55.

Irons, RD; Smith, CN; Stillman, WS; et al. (1986a) Macrocytic-megaloblastic anemia in male B6C3F₁ Swiss mice following chronic exposure to 1,3-butadiene. Toxicol Appl Pharmacol 83:95-100.

Irons, RD; Smith, CN; Stillman, WS; et al. (1986b) Macrocytic-megaloblastic anemia in male NIH Swiss mice following repeated exposure to 1,3-butadiene. Toxicol Appl Pharmacol 85:450-455.

Irons, RD; Stillman, WS; Cloyd, MW. (1987) Selective activation of endogenous ecotropic retrovirus in hematopoietic tissues of B6C3F₁ mice during the preleukemic phase of 1,3-butadiene exposure. Virology 161:457-462.

Irons, RD; Cathro, HP; Stillman, WS; et al. (1989) Susceptibility to 1,3-butadiene-induced leukemogenesis correlates with endogenous ecotropic retroviral background in the mouse. Toxicol Appl Pharmacol 101:170-176.

Jacobson-Kram, D; Rosenthal, S. (1995) Molecular and genetic toxicology of 1,3-butadiene. Mutat Res 339:121-130.

Jelitto, B; Vangala, RR; Laib, RJ. (1989) Species differences in DNA damage by butadiene: role of diepoxybutane. Arch Toxicol 13 (suppl.):246-249.

Johanson, G; Filser, JG. (1992) Experimental data from closed chamber gas uptake studies in rodents suggest lower uptake rate of chemical than calculated from literature values on alveolar ventilation. Arch Toxicol 66:291-295.

Johanson, G; Filser, JG. (1993) A physiologically based pharmacokinetic model for butadiene and its metabolite butadiene monoxide in rat and mouse and its significance for risk extrapolation. Arch Toxicol 67:151-163.

John, EM; Savitz, DA; Sandler, DP. (1991) Prenatal exposure to parents' smoking and childhood cancer. Am J Epidemiol 133:123-132.

Kaplan, EL; Meyer, P. (1958) Nonparametric estimation from incomplete observations. J Am Stat Assoc 53:457-481.

Kavlock, R; Allen, BC; Kimmel, CA; et al. (1995) Dose-response assessment for developmental toxicity: IV. Benchmark doses for fetal weight changes. Fundam Appl Toxicol 26:211-222.

Kelsey, KT; Wiencke, JK; Ward, J; et al. (1995) Sister-chromatid exchanges, glutathione S-transferase theta deletion and cytogenetic sensitivity to diepoxybutane in lymphocytes from butadiene monomer production workers. Mutat Res 335:267-273.

Kirshenbaum, I. (1978) Butadiene. In: Kirk-Othmer encyclopedia of chemical technology, 3rd ed., vol. 4. Mark, HF; Othmer, DF; Overberger, CG; et al., eds. New York, NY: John Wiley and Sons, pp. 313-337.

Kohn, MC; Melnick, RL. (1993) Species differences in the production and clearance of 1,3-butadiene metabolites: a mechanistic model indicates predominantly physiological, not biochemical, control. Carcinogenesis 14:619-628.

Kosaric, N; Duvnjak, Z; Farkas, A; et al. (1987) Ethanol. In: Ullmann's encyclopedia of industrial chemistry, 5th Rev. Ed., Vol. A9. Gerhartz, W, ed. New York, NY:VCH Publishers, p. 590.

Kraybill, HF. (1980) Evaluation of public health aspects of carcinogenic biorefractories in drinking water. Prev Med 9:212-218.

Kreiling, R. (1987) Formation of 7-(1-hydroxy-3-butene-2-yl)guanine in liver DNA of mice exposed to ¹⁴C-butadiene. Naunyn-Schmiedebergs Arch Pharmacol 335 (suppl):31.

Kreiling, R; Laib, RJ; Bolt, HM. (1986a) Alkylation of nuclear proteins and DNA after exposure of rats and mice to [1,4-14C]1,3-butadiene. Toxicol Lett 30:131-136.

Kreiling, R; Laib, RJ; Filser, JG; et al. (1986b) Species differences in butadiene metabolism between mice and rats evaluated by inhalation pharmacokinetics. Arch Toxicol 58:235-238.

Kreiling, R; Laib, RJ; Filser, JG; et al. (1987) Inhalation pharmacokinetics of 1,2-epoxybutene-3 reveal species differences between rats and mice sensitive to butadiene induced carcinogenesis. Arch Toxicol 61:7-11.

Kreiling, R; Laib, RJ; Bolt, HM. (1988) Depletion of hepatic non-protein sulfhydryl content during exposure of rats and mice to butadiene. Toxicol Lett 41:209-214.

Kreuzer, P; Kessler, W; Welter, HF; et al. (1991) Enzyme specific kinetics of 1,2-epoxybutene-3 in microsomes and cytosol from livers of mouse, rat, and man. Arch Toxicol 65:59-67.

Krewski, D; Crump, KS; Farmer, J; et al. (1983) A comparison of statistical methods for low dose extrapolation utilizing time-to-tumor data. Fundam Appl Toxicol 3:140-160.

Laib, RJ; Filser, JG; Kreiling, R; et al. (1990) Inhalation pharmacokinetics of 1,3-butadiene and 1,2-epoxybutene-3 in rats and mice. Environ Health Perspect 86:57-63.

Laib, RJ; Tucholski, M; Filser, JG; et al. (1992) Pharmacokinetic interaction between 1,3-butadiene and styrene in Sprague-Dawley rats. Arch Toxicol 66:310-314.

Legator, MS; Au, WW; Ammenheuser, M; et al. (1993) Elevated somatic cell mutant frequencies and altered DNA repair responses in nonsmoking workers exposed to 1,3-butadiene. In: Butadiene and styrene: assessment of health hazards. IARC Scientific Publications. Vol. 127. Sorsa, M; Peltonen, K; Vainio, H; et al., eds. Lyon, France: International Agency for Research on Cancer, pp. 253-263.

Lemen, RA; Meinhardt, TJ; Crandall, MS; et al. (1990) Environmental epidemiologic investigations in the styrene-butadiene rubber production industry. Environ Health Perspect 86:103-106.

Lemieux, PM; DeMarini, DM. (1992). Mutagenicity of emissions from the simulated open burning and scrap rubber tires. EPA-600/R-92-127. Washington, DC: U.S. Environmental Protection Agency.

Lieser (1983) Tierexperimentelle Pharmakokinetik von 1,3-Butadiene. Thesis. Johannes-Gutenberg-Universität, Mainz, Germany.

Ligocki, MP. (1993) Review of sources and emission estimates for 1,3-butadiene. SYSAPP-93/074. Prepared by Systems Applications International, Inc., San Rafael, CA.

Linet, MS. (1985) The Leukemias: epidemiologic aspects. Monographs in epidemiology and biostatistics. Vol. 6. New York: Oxford University Press, p. 16.

Löfgren, L; Berglund, P; Nordlinder, R; et al. (1991) Selective assessment of C₂-C_o alkenes in air by adsorption sampling and gas chromatography. Int J Environ Anal Chem 45:39-44.

Löfroth, G; Burton, RM, Forehand, L; et al. (1989) Characterization of environmental tobacco smoke. Environ Sci Technol 23:610.

Lyman, WJ; Reehl, WF; Rosenblatt, DH. (1990) Handbook of chemical property estimation methods. Washington, DC: American Chemical Society.

Macaluso, M; Larson, R; Delzell, E. (1996) Leukemia and cumulative exposure to butadiene, styrene and benzene among workers in the synthetic rubber industry. Toxicology 113:190-202.

Maldotti, A; Chiorboli, C; Bignozzi, CA; et al. (1980) Photooxidation of 1,3-butadiene containing systems: rate constant determination for the reaction of acrolein with OH radicals. Int J Chem Kinet 12:905-913.

Malvoisin, E; Roberfroid, M. (1982) Hepatic microsomal metabolism of 1,3-butadiene. Xenobiotica 12:137-144.

Malvoisin, E; Lhoest, G; Poncelet, F; et al. (1979a) Identification and quantitation of 1,2-epoxybutene-3 as the primary metabolite of 1,3-butadiene. J Chromatogr 178:419-425.

Malvoisin, E; Evrard, E; Roberfroid, M; et al. (1979b) Determination of Kováts retention indices with a capillary column and electron capture detection: application to the assay of the enzymatic conversion of 3,4-epoxy-1-butene into diepoxybutane. J Chromatogr 179:81.

Malvoisin, E; Mercier, M; Roberfroid, M. (1981) Enzymatic hydration of butadiene monoxide and its importance in the metabolism of butadiene. Biol Reactive Intermed II, 136A:437-444.

Maniglier-Poulet, C; Cheng, X. (1996) Kinetic and stereochemical differences in butadiene monoepoxide hydrolysis by rat and mouse liver microsomes. (Abstract.) Toxicologist 15:265.

Maniglier-Poulet, C; Cheng, X; Ruth, JA; et al. (1995) Metabolism of 1,3-butadiene to butadiene monoxide in mouse and human bone marrow cells. Chem-Biol Interact 97:119-129.

Mannervik, B. (1985) The isoenzymes of glutathione transferase. Adv Enzymol 57:357-417.

Maronpot, RR. (1987) Ovarian toxicity and carcinogenicity in eight recent National Toxicology Program studies. Environ Health Perspect 73:125-130.

Matanoski, GM; Schwartz, L. (1987) Mortality of workers in styrene-butadiene polymer production. J Occup Med 29:675-680.

Matanoski, GM; Santos-Burgoa, C. (1994) Butadiene and lymphatic and hematopoietic cancer (letter to the editor). Epidemiology 5:261.

Matanoski, GM; Schwartz, L; Sperrazza, J; et al. (1982) Mortality of workers in the styrene-butadiene rubber polymer manufacturing industry. A report prepared under contract to International Institute of Synthetic Rubber Producers.

Matanoski, GM; Santos-Burgoa, C; Zeger, SL; et al. (1989) Epidemiologic data related to health effects of 1,3-butadiene. In: Assessment of inhalation hazards. Mohr, U; Bates, DV; Dungworth, DL; et al., eds. New York, NY: Springer-Verlag, pp. 201-214.

Matanoski, GM; Santos-Burgoa, C; Schwartz, L. (1990) Mortality of a cohort of workers in the styrene-butadiene polymer manufacturing industry (1943-1982). Environ Health Perspect 86:107-117.

Matanoski, GM; Francis, M; Correa-Villasenor, A. (1993) Cancer epidemiology among styrene-butadiene rubber workers. In: Butadiene and styrene: assessment of health hazards. Scientific Publications. Vol. 127. Sorsa, M; Peltonen, K; Vainio, H; et al., eds. Lyon, France: International Agency for Research on Cancer, pp. 363-374.

Mattison, DR; Plowchalk, DR; Meadows, MJ; et al. (1990) Reproductive toxicity: male and female reproductive systems as targets for chemical injury. Med Clin N Am 74:391-411.

McAlister, RA; Moore, WH; Rice, J; et al. (1989) Nonmethane organic compound monitoring program final report volume II: urban air toxics monitoring program, 1988. EPA-450/4-89-005. Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency.

McAlister, RA; Moore, WH; Rice, J; et al. (1990) Urban air toxics monitoring program, 1989. EPA-450/4-91-001. Research Triangle Park, NC: Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency.

McAlister, RA; Epperson, DL; Jongleux, RF. (1991) Urban air toxics monitoring program aldehyde results, 1989. EPA-450/4-91-006. Research Triangle Park, NC: Radian Corp. and Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency.

McCabe, RW; Siegl, O; Chun, W; et al. (1992) Speciated hydrocarbon emissions from the combustion of single component fuels. II. Catalyst effects. J Air Waste Manage Assoc 42:1071-1077.

McMichael, AJ; Spirtas, R; Kupper, LL. (1974) An epidemiologic study of mortality within a cohort of rubber workers, 1964-1972. J Occup Med 16:458-464.

McMichael, AJ; Spirtas, R; Gamble, JF; et al. (1976) Mortality among rubber workers: relationship to specific jobs. J Occup Med 18:178-185.

Medinsky, MA; Leavens, TL; Csanády, GA; et al. (1994) In vivo metabolism of butadiene by mice and rats: a comparison of physiological model predictions and experimental data. Carcinogenesis 15:1329-1340.

Meinhardt, TJ; Lemen, RA; Crandall, MS; et al. (1982) Environmental epidemiologic investigations of the styrene-butadiene rubber industry: mortality patterns with discussion of the hematopoietic and lymphatic malignancies. Scand J Work Environ Health 8:250-259.

Melnick, RL; Huff, JE. (1992) 1,3-Butadiene: toxicity and carcinogenicity in laboratory animals and in humans. Rev Environ Contam Toxicol 124:111-144.

Melnick, RL; Huff, JE. (1993) 1,3-Butadiene induces cancer in experimental animals at all concentrations from 6.25 to 8,000 parts per million. In: Butadiene and styrene: assessment of health hazards. IARC Scientific

Publications. Vol. 127. Sorsa, M; Peltonen, K; Vainio, H; et al., eds. Lyon, France: International Agency for Research on Cancer, pp. 309-322.

Melnick, RL; Kohn, MC. (1995) Mechanistic data indicate that 1,3-butadiene is a human carcinogen. Carcinogenesis 16:157-163.

Melnick, RL; Huff, JE; Chou, BJ; et al. (1990a) Carcinogenicity of 1,3-butadiene in C57BL/6 × C3HF₁ mice at low exposure concentrations. Cancer Res 50:6592-6599.

Melnick, RL; Huff, JE; Bird, MG; et al. (1990b) Symposium overview: toxicology, carcinogenesis, and human health aspects of 1,3-butadiene. Environ Health Perspect 86:3-5.

Melnick, RL; Huff, JE; Roycroft, JH; et al. (1990c) Inhalation toxicology and carcinogenicity of 1,3-butadiene in B6C3F₁ mice following 65 weeks of exposure. Environ Health Perspect 86:27-36.

Melnick, RL; Sills, RC; Roycroft, JH; et al. (1994) Isoprene, an endogenous hydrocarbon and industrial chemical, induces multiple organ neoplasia in rodents after 26 weeks of inhalation exposure. Cancer Res 54:5333-5339.

Meng, Q; Recio, L; Reilly, AA; et al. (1996) The in vivo mutagenic potential of 1,3-butadiene, evaluated at the hprt locus of T-cells, is greater in mice than in rats exposed concurrently by inhalation. Abstract presented at the Twelfth Health Effects Institute Annual Conference.

Miller, LM. (1978) Investigations of selected potential environmental contaminants: butadiene and its oligomers. U.S. Environmental Protection Agency, Washington, DC. EPA-560/2-78-008.

Miller, RA; Boorman, GA. (1990) Morphology of neoplastic lesions by 1,3-butadiene in B6C3F₁ mice. Environ Health Perspect 86:37-48.

Monson, RR. (1974) Analysis of relative survival and proportional mortality. Comput Biomed Res 7:325-332.

Monson, RR; Nakano, KK. (1976) Mortality among rubber workers. I. White male union employees in Akron, Ohio. Am J Epidemiol 103:284-296.

Morrow, NL. (1990) The industrial production and use of 1,3-butadiene. Environ Health Perspect 86:7-8.

National Institute for Occupational Safety and Health (NIOSH). (1984) 1,3-Butadiene. Current Intelligence Bulletin 41, Publication No. 84-105.U.S. Department of Health and Human Services, Cincinnati, OH.

National Institute for Occupational Safety and Health (NIOSH). (1991a) A quantitative assessment of the risk of cancer associated with exposure to 1,3-butadiene, based on a low dose inhalation study in B6C3F, mice. Submitted to the Occupational Safety and Health Administration (OSHA) for Butadiene Docket (#H-041). U.S. Department of Health and Human Services, Washington, DC.

National Institute for Occupational Safety and Health (NIOSH). (1991b) Testimony from the National Institute for Occupational Safety and Health on the Occupational Safety and Health Administration's proposed rule on occupational exposure to 1,3-butadiene. U.S. Department of Health and Human Services, Washington, DC.

National Toxicology Program (NTP), U.S. Public Health Service, U.S. Department of Health and Human Services. (1984) Toxicology and carcinogenesis studies of 1,3-butadiene (CAS No. 106-99-0) in B6C3F₁ mice (inhalation studies). NTP TR 288, NIH Pub. No. 84-2544. Research Triangle Park, NC.

National Toxicology Program (NTP), U.S. Public Health Service, U.S. Department of Health and Human Services. (1985) Quarterly report from Lovelace Research Institute, January 1 through March 31, 1985. Interagency agreement 22-Y01-ES-0092. (L. Birnbaum, NTP Project Officer).

National Toxicology Program (NTP), U.S. Public Health Service, U.S. Department of Health and Human Services. (1986) Toxicology and carcinogenesis studies of 4-vinylcyclohexene (CAS No. 100-40-3) in F344/N rats and B6C3F₁ mice (gavage studies). NTP TR 303. Research Triangle Park, NC.

National Toxicology Program (NTP), U.S. Public Health Service, U.S. Department of Health and Human Services. (1989) Toxicology and carcinogenesis studies of 4-vinyl-1-cyclohexene diepoxide (CAS No. 106-87-6) in F344/N rats and B6C3F₁ mice (dermal studies). NTP TR 362, NIH Pub. No. 90-2817. Research Triangle Park, NC.

National Toxicology Program (NTP), U.S. Public Health Service, U.S. Department of Health and Human Services. (1993) Toxicology and carcinogenesis studies of 1,3-butadiene (CAS No. 106-99-0) in B6C3F₁ mice (inhalation studies). NTP TR 434. Research Triangle Park, NC.

Nauhaus, SK; Fennell, TR; Asgharian, B; et al. (1996) Characterization of urinary metabolites from Sprague-Dawley rats and B6C3F₁ mice exposed to [1,2,3,4-C-13]butadiene. Chem Res Technol 9:764-773.

Nordlinder, RG; Nilsson, RI; Buskhe, AB. (1996) 1,3-butadiene in gasoline: an analytical conclusion. J Occup Environ Med 38:463.

Norppa, H; Sorsa, M. (1993) Genetic toxicology of 1,3-butadiene and styrene. In: Butadiene and styrene: assessment of health hazards. IARC Scientific Publications. Vol. 127. Sorsa, M; Peltonen, K; Vainio, H; et al., eds. Lyon, France: International Agency for Research on Cancer, pp. 185-193.

Norppa, H; Hirvonen, A; Jarventaus, H; et al. (1995) Role of GSTT1 and GSTM1 genotypes in determining individual sensitivity to sister chromatid exchange induction by diepoxybutane in cultured human lymphocytes. Carcinogenesis 16:1261-1264.

Osterman-Golkar, SM; Kautianen, A; Bergmark, E; et al. (1991) Hemoglobin adducts and urinary mercapturic acids in rats as biological indicators of butadiene exposure. Chem Biol Interactions 80:291-302.

Osterman-Golkar, SM; Bond, JA; Ward, JB, Jr; et al. (1993) Use of hemoglobin adducts for biomonitoring exposure of 1,3-butadiene. In: Butadiene and styrene: assessment of health hazards. IARC Scientific Publications. Vol. 127. Sorsa, M; Peltonen, K; Vainio, H; et al., eds. Lyon, France: International Agency for Research on Cancer, pp. 127-134.

Osterman-Golkar, SM; Peltonen, K; Anttinen-Klementi, T; et al. (1996) Haemoglobin adducts as biomarkers of occupational exposure to 1,3-butadiene. Mutagenesis 11:145-149.

Owen, PE; Glaister, JR. (1990) Inhalation toxicity and carcinogenicity of 1,3-butadiene in Sprague-Dawley rats. Environ Health Perspect 86:19-25.

Owen, PE; Pullinger, DH; Glaister, JR; et al. (1985) 1,3 Butadiene: two-year inhalation toxicity/carcinogenicity study in the rat (abstract no. P34). In: 26th Congress of the European Society of Toxicology, 16-19 June, Kuopio, University of Kuopio. Hanhijärvi, H., ed. p. 69.

Owen, PE; Glaister, JR; Gaunt, IF; et al. (1987) Inhalation toxicity studies with 1,3-butadiene. 3. Two-year toxicity/carcinogenicity study in rats. Am Ind Hyg Assoc J 48(5):407-413.

Percy, C; Stanek, E; Gloeckler L. (1981) Accuracy of cancer death certificates and its effects on cancer mortality statistics. Am J Public Health 71:242-250.

Peter, H; Wiegand, HJ; Bolt, HM; et al. (1987) Pharmacokinetics of isoprene in mice and rats. Toxicol Lett 36:9-14.

Peterson, J; Ward, D. (1989) An inventory of particulate matter and air toxic emissions from prescribed fires in the United States for 1989. Final Report IAG #DW12934736-01-0-1989. U.S. Department of Agriculture, Forest Service.

Portier CJ; Bailer AJ. (1989) Testing for increased carcinogenicity using a survival-adjusted quantal response test. Fundam Appl Toxicol 12:731-737.

Portier, CJ; Hedges, JC; Hoel, DG. (1986) Age-specific models of mortality and tumor onset for historical control animals in the National Toxicology Program's carcinogenicity experiments. Cancer Res 46:4372-4378.

Ramnäs, O; Ostermark, U; Pettersson, G. (1994) Characterization of sixty alkenes in a cat-cracked gasoline naphtha by gas chromatography. Chromatographia 38:222-223.

Recio, L; Goldsworthy, TL. (1995) The use of transgenic mice for studying mutagenicity induced by 1,3-butadiene. Toxicol Lett 82:607-612.

Recio, L; Cochrane, J; Simpson, D; et al. (1990) DNA sequence analysis of in vivo hprt mutation in human T-lymphocytes. Mutagenesis 5:505-510.

Reynolds, SH; Stowers, SJ; Patterson, RM; et al. (1987) Activated oncogenes in B6C3F₁ mouse liver tumors: implications for risk assessment. Science 237:1309-1316.

Robinson, JP; Wiley, JA; Piazza, T; et al. (1989) Activity patterns of California residents and their implications for potential exposure to pollution. Draft final report. California Air Resources Board, Sacramento, CA. CARB-46-177-33.

Rolzhäuser, HP. (1985) Pharmakokinetik von Butadienmonoxid. Thesis, Johannes-Gutenberg-Universität, Mainz, Germany.

Rosenthal, SL. (1985) The reproductive effects assessment group's report on the mutagenicity of 1,3-butadiene and its reactive metabolites. Environ Mutagen 7:933-945.

Rothman, K; Boice, J. (1982) Epidemiologic analysis with a programmable calculator. Boston, MA: Epidemiology Resources, Inc., pp. 11-17.

Sabourin, PJ; Burka, LT; Bechtold, WE; et al. (1992) Species differences in urinary butadiene metabolites; identification of 1,2-dihydroxy-4-(N-acetylcysteinyl) butane, a novel metabolite of butadiene. Carcinogenesis 13:1633-1638.

Sandberg, DV; Pickford, SG; Darley, EF. (1975) Emissions from slash burning and the influence of flame retardant chemicals. J Air Pollut Control Assoc 25:278-281.

Santodonato, J. (1985) Monograph on human exposure to chemicals in the workplace: 1,3-butadiene (PB86-147261). Washington, DC: U.S. National Technical Information Service.

Santos-Burgoa, C. (1988) Case-control study of lymphohematopoietic malignant neoplasms within a cohort of styrene-butadiene polymerization workers. Thesis. Baltimore, MD, Johns Hopkins School of Hygiene and Public Health.

Santos-Burgoa, C; Matanoski, GM; Zeger, S; et al. (1992) Lymphohematopoietic cancer in styrene-butadiene polymerization workers. Am J Epidemiol 136:843-854.

Sax, NI; Lewis, RJ, Sr. (1987) Hawley's condensed chemical dictionary, 11th ed. New York, NY: Van Nostrand Reinhold, p. 177.

Schmidt, U; Loeser, E. (1985) Species differences in the formation of butadiene monoxide from 1,3-butadiene. Arch Toxicol 57:222-225.

Schottenfeld, D; Fraumeni, JF, Jr. (1996) Cancer epidemiology and prevention. 2nd ed. New York: Oxford Univ Press, p. 856.

Seaton, MJ; Follansbee, MH; Bond, JA. (1995) Oxidation of 1,2-epoxy-3-butene to 1,2:3,4-diepoxybutane by cDNA expressed human cytochromes P450 2E1 and 3A4 and human, mouse and rat liver microsomes. Carcinogenesis 16:2287-2293.

Shah, JJ; Heyerdahl, EK. (1988) National ambient volatile organic compounds database update (project report). U.S. Environmental Protection Agency, Atmospheric Sciences Research Laboratory, Research Triangle Park, NC. EPA/600/3-88/010(a).

Sharer, JE; Elfarra, AA. (1992) S-(2-Hydroxy-3-buten-1-yl)glutathione and S-(1-hydroxy-3-buten-yl-)glutathione are in vivo metabolites of 1,3-butadiene monoxide: detection and quantitation in bile. Chem Res Toxicol 5:787-

Sharer, JE; Duescher, RJ; Elfarra, AA. (1991) Formation, stability, and rearrangements of glutathione conjugates of butadiene monoxide: evidence for the formation of stable sulfrane intermediates. Chem Res Toxicol 4:430-436.

Sharer, JE; Duescher, RJ; Elfarra, AA. (1992) Species and tissue differences in the microsomal oxidation of 1,3butadiene and the glutathione conjugation of butadiene monoxide in mice and rats. Drug Metab Dispos 20:658-664.

Shields, PG; Xu, GX; Blot, WJ; et al. (1995) Mutagens from heated Chinese and U.S. cooking oils. J Natl Cancer Inst 87:836-841 [abstract from Toxline 95:258350].

Siematycki, J; ed. (1991) Risk factors for cancer in the workplace. Boca Raton, FL: CRC Press.

Sjöblom, T; Lähdetie, J. (1996) Micronuclei are induced in rat spermatids in vitro by 1,2,3,4-diepoxybutane but not by 1,2-epoxy-3-butene and 1,2-dihydroxy-3,4-epoxybutane. Mutagenesis 11:525-528.

Soderkvist, P; Goodrow, T; Cochran, C; et al. (1992) Characterization of p53 mutations and allelic losses on chromosome 4, 11, and 14 in butadiene-induced tumors of B6C3F₁ mice. J Cell Biochem 16B:138.

Sorsa, M; Autio, K; Demopoulos, NA; et al. (1994) Human cytogenetic biomonitoring of occupational exposure to 1,3-butadiene. Mutat Res 309:321-326.

Sorsa, M; Osterman-Golkar, S; Peltonen, K; et al. (1996) Assessment of exposure to butadiene in the process industry. Toxicology 113:77-83.

SRI International, 1993. 1993 directory of chemical producers--USA. Menlo Park, CA: SRI International.

Startin, JR; Gilbert, J. (1984) Single ion monitoring of butadiene in plastics and foods by coupled mass spectrometry-automatic headspace gas chromatography. J Chromatogr 294:427-430.

Stjernfeldt, M; Berglund, K; Lindsten, J; Ludrigsson, J. (1986) Maternal smoking during pregnancy and risk of childhood cancer. Lancet 1(8494):1350-1352.

Sun, JD; Dahl, AR; Bond, JA; et al. (1989a) Characterization of hemoglobin adduct formation in mice and rats after administration of [14C]butadiene or [14C]isoprene. Toxicol Appl Pharmacol 100:86-95.

Sun, JD; Dahl, AR; Bond, JA; et al. (1989b) Metabolism of inhaled butadiene to monkeys: comparison to rodents. Exp Pathol 37:133-135.

Tarone, RE. (1975) Tests for trend in life table analysis. Biometrika 62:679-682.

Tates, AD; van Dam, FJ; de Zwart, FA; et al. (1996) Biological effect monitoring in industrial workers from the Czech Republic exposed to low levels of butadiene. Toxicology 113:91-99.

Thier, R; Müeller, M; Taylor, JB; et al. (1995) Enhancement of bacterial mutagenicity of bifunctional alkylating agents by expression of mammalian glutathione S-transferase. Chem Res Toxicol 8:465.

Thornton-Manning, JR; Dahl, AR; Bechtold, WE; et al. (1995a) Disposition of butadiene monoepoxide and butadiene diepoxide in various tissues of rats and mice following a low-level inhalation exposure to 1,3-butadiene. Carcinogenesis 16:1723-1731.

Thornton-Manning, JR; Dahl, AR; Bechtold, WE; et al. (1995b) Gender differences in the metabolism of 1,3-butadiene in Sprague-Dawley rats following low-level inhalation exposure. Carcinogenesis 16:2875-2878.

Thornton-Manning, JR; Bechtold, WE; Griffith, RF; et al. (1996) Tissue concentrations of butadiene epoxides in rodents following multiple and single exposures to 1,3-butadiene (BD) by inhalation. (Abstract.) Toxicologist 30:215.

Thurmond, LM; Lauer, LD; House, RV; et al. (1986) Effect of short-term inhalation exposure to 1,3-butadiene on murine immune functions. Toxicol Appl Pharmacol 86:170-179.

Travis, CC. (1988) Carcinogen risk assessment: contemporary issues in risk analysis. Vol. 3. New York, NY: Plenum Press.

- U.S. Department of Health and Human Services (U.S. DHHS), Public Health Service. (1992) Toxicological profile for 1,3-butadiene.
- U.S. Department of Labor, Occupational Safety and Health Administration (OSHA). (1990, August 10) Occupational exposure to 1,3-butadiene; proposed rule and notice of hearing. Federal Register 55:32736-32776.
- U.S. Department of Labor, Occupational Safety and Health Administration (OSHA). (1996, November 4) Occupational exposure to 1,3-butadiene; final rule. Federal Register 61(214):56745-56795.
- U.S. Environmental Protection Agency. (1978) Interim primary drinking water regulations. Federal Register 43:20135-29150.
- U.S. Environmental Protection Agency. (1985) Mutagenicity and carcinogenicity assessment of 1,3-butadiene. Office of Health and Environmental Assessment, Office of Research and Development, Washington, DC. EPA/600/8-85/004F.
- U.S. Environmental Protection Agency. (1986, Sept. 24) Guidelines for carcinogen risk assessment. Federal Register 51(185):33992-34003.
- U.S. Environmental Protection Agency. (1989a) AIRS user's guide, volumes I-VII. Office of Air Quality Planning and Standards, Research Triangle Park, NC.
- U.S. Environmental Protection Agency. (1989b) 1989 Urban Air Toxics Monitoring Program. Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA/450/4-91-001.
- U.S. Environmental Protection Agency. (1989c) 1989 Urban Air Toxics Monitoring Program; aldehyde results. Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA/450/4-91-006.

- U.S. Environmental Protection Agency. (1990a) 1989 Urban Air Toxics Monitoring Program. Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA/450/4-91-024.
- U.S. Environmental Protection Agency (1990b) 1990 Urban Air Toxics Monitoring Program carbonyl results. Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA/450/4-91-025.
- U.S. Environmental Protection Agency. (1991) Non-road engine and vehicle emission study. Office of Mobile Sources, Ann Arbor, MI. EPA 21A-2001.
- U.S. Environmental Protection Agency. (1992) Compilation of air pollutant emission factors (AP-42). Supplement E, October 1992. U.S. Environmental Protection Agency.
- U.S. Environmental Protection Agency. (1993a) Motor vehicle-related air toxics study. Office of Mobile Sources, Ann Arbor, MI. EPA/420-R-93-005.
- U.S. Environmental Protection Agency. (1993b) The Integrated Air Cancer Project, Boise Study; research to improve risk assessment of area sources, woodstoves and mobile sources. Office of Research and Development. Presentation to the Office of Mobile Sources, August 1993.
- U.S. Environmental Protection Agency. (1994a) Locating and estimating air emissions from sources of 1,3-butadiene. (September 1994 draft.) Office of Air Quality Planning and Standards, Research Triangle Park, NC.
- U.S. Environmental Protection Agency. (1994b) Memo from Rich Cook, Office of Mobile Sources to Dennis Beauregard, Office of Air Quality Planning and Standards. November 9, 1994.
- U.S. Environmental Protection Agency. (1995) The use of the benchmark-dose approach in health risk assessment. Office of Research and Development, Washington, DC. EPA/630/R-94/007.
- U.S. Environmental Protection Agency. (1996, April 23) Proposed guidelines for carcinogen risk assessment. Federal Register 61(79):17960-18011.
- U.S. International Trade Commission (USITC). (1990) Synthetic organic chemicals; United States production and sales. 1989. Pub. 2338. Washington, DC: Government Printing Office.
- U.S. National Library of Medicine. (1991) Toxic Chemical Release Inventory (TRI) Data Bank, Bethesda, MD.

Uuskula, M; Jarventaus, H; Hirvonen, A; et al. (1995) Influence of GSTM1 genotype on sister chromatid exchange induction by styrene-7,8-oxide and 1,2-epoxy-3-butene in cultured human lymphocytes. Carcinogenesis 16:947-950.

Van Duuren, BL; Nelson, N; Orris, L; et al. (1963) Carcinogenicity of epoxides, lactones, and peroxy compounds. J Natl Cancer Inst 31:41-55.

Van Duuren, BL; Langseth, L; Orris, L; et al. (1966) Carcinogenicity of epoxides, lactones, and peroxy compounds. IV. Tumor response in epithelial and connective tissue in mice and rats. J Natl Cancer Inst 37:825-838.

Verschueren, K. (1983) Handbook of environmental data on organic chemicals, 2nd ed. New York, NY:Van Nostrand Reinhold, pp. 295-297.

Ward, DE; Hao, WM. (1992) Air toxic emissions from burning of biomass globally Cpreliminary estimates. Paper 92-98.03 Presented at the 85th Annual Meeting of the Air and Waste Management Association, Kansas City, MO.

Ward, JB, Jr; Au, WW; Ammenheuser, MM; et al. (1994) hprt Mutant lymphocyte frequencies in workers at a 1,3-butadiene production plant. Environ Health Perspect 102:79-85.

Ward, EM; Fajen, JM; Ruder, A. (1995) Mortality study of workers in 1,3-butadiene production units identified from a chemical workers cohort. Environ Health Perspect 103:598-603.

Ward, JB, Jr; Ammenheuser, MM; Bechtold, WE. (1996a) Assessment of butadiene exposure in a rubber plant using urine metabolite and HPRT mutant frequency as biological markers of exposure and effect. (Abstract.) Environ Molec Mutag 27(suppl. 27):73.

Ward, JB, Jr.; Ammenheuser, MM; Wharton, EB, Jr.; et al. (1996b) Biological monitoring for mutagenic effects of occupational exposure to butadiene. Toxicology 113:84-90.

Ward, EM; Fajen, JM; Ruder, A. (1996c) Mortality study of workers employed in 1,3-butadiene production units identified from a large chemical workers cohort. Toxicology 113:157-168.

Weast, RC, ed. (1989) CRC handbook of chemistry and physics, 70th ed. Boca Raton, FL:CRC Press, p. C-160.

Wijnberg, L; Faoro, R. (1989) Urban air toxics monitoring program Cresults of aldehyde monitoring fiscal year 1988. PEI Associates and the U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Research Triangle Park, NC. September 1989.

Wistuba, D; Nowotny, H-P; Trágerf, O; et al. (1989) Cytochrome P-450-catalyzed asymmetric epoxidation of simple prochiral and chiral aliphatic alkenes: species dependence and effect of enzyme induction of enantioselective oxirane formation. Chirality 1:127.

Xiao, Y; Tates, AD (1995) Clastogenic effects of 1,3-butadiene and its metabolites 1,2-epoxybutene and 1,2,3,4-diepoxybutane in splenocytes and germ cells of rats and mice in vivo. Environ Mol Mutagen 26:97-108.